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Remarks

Claims 1 through 16 and 24 through 30 remain pending in the application.

The office action rejects claims 1 through 7, 10, 12 through 14, 16, and 24 through 30 as anticipated by Stringer, et al., Integrated Blood Handling System Having Active Gas Removal System and Methods of Use, U.S. Pub. 2002/011485 (Aug. 15, 2004), under the assertion that Stringer discloses a shell defining several chambers including a central chamber, and impeller and a gas vent, as well as the inputs and outputs as claimed.

Stringer discloses an integrated blood processing component 31 with a single housing 40, further comprising several chambers 55, 50, 47, 48, 54, etc., a blood pump impeller 75, a filter 59, a gas removal system 50, 46, and an oxygenator system 53, 70. Stringer discloses a blood pump wherein the impeller 75 is physically located in a chamber 55 separate from the gas removal system 50, although the two chambers are contained within an integral housing 40. In Stringer, gas is removed by the filter, not the impeller, which is downstream of the filter, does not operate to remove gas from the blood. Stringer's impeller does not impart rotational motion to the blood in the gas removal system and thus does not impart centrifugal effects to remove the air from the blood. This is evidenced since the impeller 75 is located downstream of the gas removal chamber 50 and thus any rotational energy imparted by the impeller would not be imparted upstream in the gas removal chamber 50. In fact, after the

impeller imparts rotational energy to the blood, gas (oxygen) is added to the blood in Stringer's system.

In contrast, in amended claim 1, air is removed from blood within a chamber by an impeller that actively spins the blood to generate centrifugal forces on the blood to force the buoyant air to migrate radially toward the center of the chamber within the housing where it is removed by a gas vent. There appears to be no suggestion or disclosure of a single chamber comprising an impeller that spins the blood to force gas to migrate to the center by centrifugal effects, for removal, as claimed. Stringer does not disclose a centrifugal type gas removal apparatus wherein the blood is spun to generate the centrifugal forces to remove gases. There is no motivation or suggestion to use the device as a gas removal apparatus since the impeller is not located within the same chamber where the air is removed from the blood.

Because the reference cited by the Examiner does not disclose, teach or suggest an apparatus adapted for removing gas bubbles from blood comprising an axially elongate shell defining a chamber, an impeller disposed within the chamber, a motor operably connected to the impeller, a gas vent in fluid communication with the central axis of the shell, a blood inlet port, and a blood outlet port located at the radial periphery of said shell, wherein the impeller is operable to rotate a volume of blood within the chamber about the central axis of the shell thus forcing air bubbles within the volume of blood to migrate radially inward in response to centrifugal forces imparted on the volume of blood by the rotation of said blood, applicants assert that Claim 1 is not anticipated by Stringer. Applicants therefore respectfully submit that Claim 1 is patentably

distinguished over the cited reference and Applicants respectfully request allowance of Claim 1.

Claims 2 through 7, 10, 12 through 14, and 16, which depend from Claim 1, are believed to be patentable for the same reasons articulated above with respect to Claim 1, and because of the additional features recited therein.

Referring to claim 24, Stringer discloses a blood handling system with a single housing comprising several chambers, a blood pump system, an integral filter, a gas removal system, and an oxygenator system. Stringer discloses a blood pump wherein the impeller is physically located in a chamber separate from the gas removal system, although the two separate chambers are contained within an integral housing. Stringer's impeller does not impart rotational motion to the blood in the gas removal system and thus does not impart centrifugal effects to remove the air from the blood.

In contrast, as claimed in amended claim 24, air is removed from blood within a housing comprising an impeller, driven by a motor, that actively spins the blood circumferentially about an axis to generate centrifugal forces on the blood to force the buoyant air to migrate radially toward the center of the housing where it is removed by a gas vent.

Stringer does not disclose an impeller that spins the blood to force gas to migrate to the center by centrifugal effects, for removal, as described in Claim 24. Stringer does not disclose a centrifugal type gas removal apparatus wherein the blood is spun to generate the centrifugal forces by a motor driven impeller, and contains no motivation or suggestion to use the device as a gas removal apparatus since the impeller is not

located within the same chamber where the air is removed from the blood.

Because the reference cited by the Examiner does not disclose, teach or suggest an apparatus adapted for removing gas bubbles from blood comprising an axially elongate shell defining a chamber, an impeller disposed within the chamber, wherein the impeller rotates about an axis concentric with the axis of the shell, further wherein the impeller is operable to rotate a volume of blood substantially filling the chamber about the axis of the shell, a motor operably connected to the impeller to cause the impeller to rotate about its axis, a gas vent in fluid communication with the central axis of the shell, wherein gas collected along the central axis of the shell is removed from said shell through the gas vent, a blood inlet port operable to fill the chamber with blood; and a blood outlet port located at the radial periphery of said shell, wherein said blood outlet port is operable to drain blood from the chamber, wherein the blood inlet port receives blood that has been drained from a patient's body and the blood outlet port delivers blood back to a patient, wherein the blood delivered back to the patient has had air bubbles removed primarily by centrifugal forces generated on the air bubbles by the rotating blood within the apparatus, Applicants assert that Claim 24 is not anticipated by Stringer. Applicants therefore respectfully submit that Claim 24 is patentably distinguished over the cited reference and Applicants respectfully request allowance of Claim 24.

Claims 25 through 29, which depend from Claim 24, are believed to be patentable for the same reasons articulated above with respect to Claim 24, and because of the additional features recited therein.

Referring to claim 30, which has been amended, air is removed from blood within a housing comprising an impeller, driven by a motor, that actively spins the blood circumferentially about an axis to generate centrifugal forces on the blood to force the buoyant air to migrate radially toward the center of the housing where it is removed by a gas vent. As discussed in reference to claims 1 and 24, Stringer does not disclose structures which operate as required by the claim.

The Examiner rejected Claim 8 as obvious over Stringer, et al. in view of Jassawalla, et al., U.S. Patent No. 6,264,601. Claim 8, which depends from Claim 1, is believed to be patentable for the same reasons articulated above with respect to Claim 1, and because of the additional features recited therein.

The Examiner rejected Claims 9 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Stringer, et al. in view of Yamazaki, U.S. Patent 6,769,871. Claims 9 and 15, which depend from Claim 1, are believed to be patentable for the same reasons articulated above with respect to Claim 1, and because of the additional features recited therein.

The Examiner rejected Claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Stringer, et al. in view of Elgas, et al., U.S. Patent 5,823,987. Claim 11, which depends from Claim 1, is believed to be patentable for the same reasons articulated above with respect to Claim 1, and because of the additional features recited therein.

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Conclusion

This response has addressed all of the Examiner's grounds for rejection. The rejections based on prior art have been traversed. Reconsideration of the rejections and allowance of the claims is requested.

Date: January 16, 2007 By: _____

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